Changing Rural Lighting in Malawi

The LFL Program

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I. CAMPAIGN GOAL AND STRATEGIC CONTEXT

A. What is the goal of the social/behavioral change campaign?

The overarching goal of the campaign is to change lighting energy consumption among rural Malawians in non-electrified regions away from traditional energy sources (e.g., kerosene, candles, and biomass) toward solar powered LED lanterns. The proposed campaign will be implemented in parallel with, and in support of, the "Loans for Lights" (LFL) pilot program described in more detail below. More specifically, a critical mass of "early adopters" will be identified and targeted in selected communities to purchase a solar lantern. This group will spur new economies of scale for the product and facilitate wider social acceptance of the new technology. Through an advocacy process and word-of-mouth advertising they will also contribute to shaping new long-run social norms. In quantitative terms, the expected goal of the campaign is to increase growth in solar powered LED lanterns in the target communities by 20% or more after the campaign compared to a baseline.

B. What is the commercial/programmatic context of the campaign?

The LFL program is implemented by a multi-stakeholder partnership. The partners aim to demonstrate proof of concept for a new business model to ramp up sales and diffusion of solar LED lamps among Malawian families living at the bottom of the pyramid.[1] LFL aims to scale-up commercial solar lantern sales through the formation of strategic alliances between mainstream financiers (e.g., Standard Bank), carbon project developers (e.g., Carbonsoft), lamp retailers and distributors (e.g., SolarAid[2], Barefoot Power), and pioneering local Micro-Finance Institutions (e.g., the Global Village Energy Partnership). LFL is co-financed by Standard Bank and the ACAD Facility[3] and managed by Carbonsoft. It is a complex program involving different distributors and local MFIs. Previous clean energy dissemination programs have shown that "give away" models typically fail to be sustainable or achieve broad market scale-up. LFL therefore will adopt a commercial approach. High up-front costs pose a major barrier to broader technology diffusion, even though for many households economic payback periods can be just a matter of months, and despite the fact that satisfaction among early adopters is high. Through LFF, retail customers can purchase a lantern from an approved supplier on an

[1] The business model pivots around an assumption that achieving scale-up hinges upon enhancing poor households' access to finance. This can be achieved through "crowding in" MFIs by financing retailers who can offer consumer finance or by having MFIs serve the market by offering direct loans to households to purchase a solar lamp.

[2] SolarAid has extensive experience distributing solar lights in Southern and Eastern Africa through franchises, and it frequently works with schools to ensure availability and quality of solar lights. It has sold more than sold more than 120,000 units in the last two years.

[3] In order to facilitate the achievement of these objectives, ACAD is supporting a study to get a better handle on household credit risk and repayment factors such that wholesale lenders to MFIs can better understand the key factors and barriers to the uptake of the technology in the marketplace.

installment plan. By effectively "bundling" the retail product together with consumer credit and by marketing this new "LFL product" to customers that wouldn't otherwise have knowledge or access to such credit, LFL partially removes or mitigates a main barrier to the behavioral change.[4]

Several solar LED lighting system models are already sold in rural Africa, predominantly manufactured in China and then imported. They generally consist of an LED lamp, a solar photovoltaic (PV) panel, electronic circuits, and a storage battery. The PV panel captures solar energy and converts it into electrical energy that is stored in the battery, which powers the lamp. The main models are "desktop" or portable study aid aids, and larger kits suitable for lighting up a single room. For detailed technical specifications, see Annex I. The LFL program context is characterized by a more "open source" technology platform, in the sense that the dissemination strategy is not tied to a particular brand or model, but rather adopts minimum standards for program inclusion.[5] In some ways, this can complicate a marketing strategy. The "branding" of the actual product sold could be quite important to the success of LFL and its marketing campaign. Therefore, if the LFL pilot is successful then at some stage products might be "rebranded" in a more unified way in order to resonate with the key messages of the social marketing campaign.

C. Who are the actors in the campaign? What is their role?

A targeted team for the design and implementation of the campaign will be developed on the basis of this paper as a discussion document. The team should include at minimum one staff member of each of the core partner institutions to the LFL program, as well as an external development communications expert with experience in energy efficiency programs. Depending on interest and resources, one or two members of local institutions in Malawi that could partner with LFL on the campaign could also be invited to participate in the team, although the task team should be lean and able to delegate responsibility to individuals or institutions. For example, all LFL partners should buy into the campaign design and objectives, however, the team may decide that one partner institutions (e.g., the MFI) takes a lead role in the implementation of the campaign, or in the evaluation. A more detailed allocation of roles is elaborated in the next section.
In addition to the core actors, external advisors and collaborators in the campaign could be recruited to contribute resources, staff time, information and ideas, as well as help to get the messages out once they have been developed. Among these potential external campaign partners include: The Chinansi Foundation (a local NGO with 9 staff, focused

[4] It is important to emphasize that the financial barrier is not completely removed, because extending consumer finance would of course increase the total final cost of the product to consumers. For example, in the Malawian Millennium Villages Pilot Project from 2008-2010, the retail price of a solar LED lamp was marked up by 20% from the wholesale cost to collectives in order to compensate for the risks of allowing pay-offs in installments over two- to-six months. Since most customers will be unfamiliar with the concept of consumer credit, the LFL product could actually create new barriers in terms of additional consumer education requirements, overly complicating a value proposition to the behavioral change, impacting or reshaping consumer attitudes of their inherent suitability for the product, influencing perceived self-efficacy toward the behavior, etc. This would need to be closely monitored.

[5] This encourages local vendors to sell the most suitable products that meet end user needs.

on sustainable development projects); the Malawi Environmental Endowment Trust (which provides small grants for local environmental initiatives, and has a program area focused on Environmental Education, Information & Communication); The Sustainable Energy Society of Southern Africa; and the Environmental Education Association of Southern Africa (EEASA).

Before the first phase of the campaign, an initial "step 0", lasting for roughly one month will be implemented. The focus of this preliminary stage will be on forming a task team, harmonize expectations, and clarifying the roles of the team members who will work on the subsequent phases. The draft budget presented herein shall also be reviewed and validated. As a complex project involving several actors across the technology, finance, implementation and advocacy spectrum, good internal communication is an essential ingredient to a successful campaign. It is important that the campaign's benefits or expected impact is clear to all stakeholders, and that adequate resources are secured for the campaign in relation to measured results. After the team forming stage, regular brainstorming meetings should be scheduled in order to come to consensus on critical issues such as selection of appropriate media outlets, how to harness the power of peer education, word-of-mouth advertising, and social networks, and how to maximize the return on investment from special product placement/demonstration events.

D. What are the expected environmental benefits?

Successful adoption of the new behavior would have strong direct environmental impacts (particularly on air quality) and resource conservation. These impacts can be measured along three main axes:

(a) better household indoor air quality linked to lower emissions of particulate matter & VOCs
(b) climate benefits linked to reduced GHG emissions from baseline fuel consumption[6]
(c) reduced deforestation, depletion of non-renewable biomass resource stocks[7]

[6] Monitoring needs to justify that households discontinue energy consumption behavior measured in the baseline study after the purchase of the solar LED lighting systems. Rebound effects also need to be monitored. Households may continue using kerosene and/or candles in addition to solar lamps, at lower levels of frequency. Some PV panel products can also be used to charge mobile phones; in this case households may use the product more for that purpose than for lighting services, with a reduced net environmental benefit.

[7] This benefit isn't applicable in all cases or districts. Although the vast majority of energy consumed in rural areas of Malawi comes from biomass (mostly firewood), most households rely on kerosene for lighting and much of the biomass used for wood fuel in Malawi is renewable. A larger share is expected to be non-renewable in the coming decades with population increases. In high poverty zones where kerosene isn't widely available, or in areas with poorly organized wood fuel supply chains, however, this could be relevant. See Kambewa, P. and Chiwaula, L. (2010) *Biomass energy use in Malawi*: *A background paper for the International Institute for Environment and Development*, October 2010.

Finally, in introducing energy efficient appliances to new and impressionable audiences, the campaign is poised to make a large indirect impact on the environment. Using solar lamps are a natural "stepping stone" to other sustainable energy behaviors. For most rural Malawians, an LFL lamp would be a "big ticket" purchase item akin to a mobile phone, representing as much as two month's wages, and thus expected to bring a high personal or social value in relation to its cost. Even absent any "green" motivation, as a consumer's likely first individual "experience" with an energy efficient appliance, a LFL purchase may well strongly reshape attitudes and norms vis-à-vis future behaviors on energy conservation—particularly if supported by appropriate communications and educational materials.

II. GENERAL OUTLINE OF ACTION PLAN

A. How will the campaign be structured? What is the timeframe?

The campaign will be more of a hybrid between a pure behavioral change campaign and a classical marketing strategy for a commercial product with a strong social benefit that is relevant to the needs social enterprises and impact investors. Its implementation will follow a five step process typically used in social marketing campaigns, based on the so-called "e-model". The work plan will be implemented over the course of 16 months.

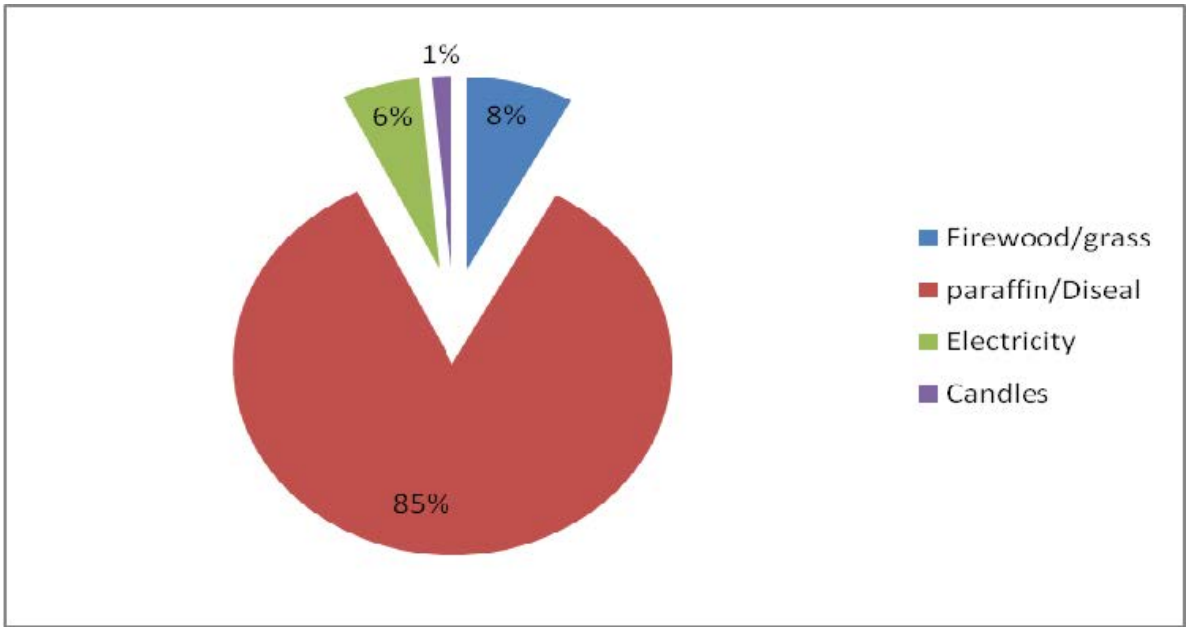
B. What will happen in the first stages?

The first stage—the *baseline and assessment* phase—will run for three months and will be comprised of three elements: (i) conducting of background research including a literature review on current lighting practices in rural Southern Africa, and Malawi in particular[8], (ii) informant interviews conducted either in person or by telephone with key actors on the ground, and (iii) household baseline energy surveys performed in a target group (i.e. pre-selected, representative villages) and in a control group. These methods will explore exactly what the target audience already knows, believes, and cares about when it comes to lighting. Taken together, the results of these three information sources will thus establish a clear benchmark for what rural households in Malawi already do for lighting services, what energy forms and carriers they are using to support those practices, and whether those practices can be further broken down into specific sub-behaviors.

[8] See for example, "Malawai Customer Baseline, Who are SunnyMoney users?" SolarAid survey data collected January 2010—March 2011, http://solar-aid.org/projects/Malawi%20Customer%20Baseline%20Analysis.pdf. A broad survey (not specific to a more concentrated target province or community) reveled that 62% of households used kerosene lighting (hurricane lanterns or homemade ones), 41% used battery-powered lanterns or flashlights, and 21% used candles, and 9% percent used firewood presumably both as a secondary output from cooking, and by burning sticks for short-term lighting. A small number reported using mobile phone screens for temporary illumination. Obviously, many households use multiple sources, so one may need to question which is the primary source for a steady source of light at night.

Locally trained enumerators shall carry out the field surveys (likely on a paid basis but perhaps volunteered in-kind by partner entities). For now, our working baseline for energy services can be taken from the studies cited above and generally characterized by the chart below. It shows that the majority of households in Malawi use kerosene with a minority share using other energy sources like dried grass, firewood, candles, or non-solar battery-powered lanterns.

Table 1: Energy Sources for Household Lighting in Malawi



Source: Malawi Second Integrated Household Survey

Due to budgetary limitations, the primary method for an initial qualitative assessment would be targeted informant interviews with existing local vendors and retailers such as Solar Aid and Barefoot Power, as well as other community-based NGOs working in the rural energy/environmental space. The interviews will be conducted by a member of the task team with support from a hired communications expert. These targeted interviews will be supplemented by any available raw data on sales records, existing customers, as well as write-ups from any previous focus group supplied from LFL partner entities such as distributors and franchisees. Specifically, interviews will gauge existing knowledge, actions, and practices in the local market and help inform the formulation of much more pointed questions for subsequent focus groups to be conducted in the next phase of the campaign.[9] A list of sample questions to be used in informant interviews is in Annex 2.

[9] Baseline data to be captured includes: what are existing lighting behavior patterns, fuel carriers and sources, average weekly expenditures, possible variations by season.

Most previous solar light campaigns have taken a very broad, mass-market approach. Our campaign will try to hone in on, and prioritize marketing efforts toward those most predisposed to making the switch (elaborated further in the next section). Informant interviews will thus help to segment the entire population of non-electrified, rural Malawian households that do not currently own a solar lamp into sub-groups with the highest perceived benefit, predisposition, and perceived self-efficacy for making the change. This will help determine the "early adopters" critical to achieving scale-up.

After synthesizing the information obtained from the first phase, the second stage will involve campaign *planning* and *pre-testing* of messages uniquely formulated for specific segmented target audience groups. This stage will last approximately for two months. At this stage, the team will begin to devise marketing messages that would resonate with the psychological, emotional, and economic factors common to each of the target groups. The media that has been selected here as most effective to reach these unique target groups will also be reevaluated based on available budgetary resources. The main method for pre-testing will be to conduct focus groups comprised of roughly 9-12 target customers. Focus group summaries will augment initial stage 1 qualitative assessments. The questions raised will be based on prevailing perceptions of the main benefits of solar LED lanterns and drawbacks of current consumption. The focus groups will also gradually introduce the target groups to the product and the campaign messages and see if the product genuinely meets their needs and addresses perceived (non-financial) barriers to adoption. They will also seek to uncover heretofore undisclosed barriers to using the product besides lack of knowledge (See Annex 3 for sample draft questions).

In addition to, or in conjunction with, the focus groups, a simple "willingness-to-pay" survey could be devised to approximate the relative utility benefits that the various household decision-makers perceive from switching lighting carriers.[10] Respondents could be asked how many months of wages they would be willing to pay for a lighting solution (*not* specifying solar LED) that would deliver one of the main benefits discovered in the qualitative research (e.g. convenience, health, safety, quality, income generating opportunity). That would help to which benefits are broadly perceived to be of greatest value, and to which households. For example, a woman-headed household with small infants may be willing to pay $10 for a "fire-proof" lantern, whereas a male head of household with three children attending school may reveal a willingness to pay $20 for a lantern that allows his kids to do better in class. In conjunction with the focus groups, such simple surveys will make it easier to identify the early adopters and craft messages that resonate best with them. Primary perceived benefits are subjective and will be highly relative depending on household characteristics.

[10] Early testing needs to be cognizant of whether introducing concepts around affordability or willingness to pay create any kind of resistance or unintended backlash toward the product.

The pre-testing of the core campaign messages developed will be extremely important. At least two months is dedicated to this stage in order to ensure that all of the materials and non-traditional advertising mechanisms that will be developed have adequate time for consultative development. Prior to the focus groups, they will be also be pre-tested with hired external communication experts, randomly selected members of the hypothetical target audiences, and community "influence shapers" such as chiefs and religious leaders. A specific focus groups uniquely composed of distributors and MFI loan officers should also be organized to ensure that the offering under LFL (i.e. specific lantern brands and bundled consumer finance)

C. What will happen in the main stage of the campaign?

In the third stage, the campaign will be implemented in a full-scale roll out. This stage is expected to run for an intensive 7-month period in pre-selected pilot districts. This stage will actually be divided into sub-stages. In the first month, low-level "soft" product advertising and more general awareness raising activities will be the main focus of the campaign. The idea is to plant a seed in the minds of potential target customers of the benefits of LFL and to inspire "pre-contemplation" of the switch. Local staff from the LFL partners will be asked to participate in community radio talk show programs to outline the economic and social costs of current practices. Local journalists will be encouraged to write stories outlining the health hazards related to burns and fires from kerosene lamps. Alternatives such as solar LED lighting can be introduced, but there will be no hard sell of the product. Rather the idea is to get rural Malawians to be more mindful of their current lighting practices and the individual and societal cost. Early messages of the campaign should also focus on reframing energy efficient behavior as something linked to social status and household well-being (e.g., no more nagging by your wife about smoke or babies getting burned", kids going better at school, more quality time at night for family togetherness.) The theory is that although economic drivers will be a very important factor in making the decision to purchase a solar lantern, other factors relating to family values and social status, if reinforced, could also be strong drivers.

Following this sub-stage, a "harder" advertising campaign will be pursued. The main vehicles for getting the messages out will be:

(a) special promotional events that give targeted audiences a tangible feel for the product and provide "positive" peer pressure to get customers to sign-up for purchase a LFL product on the spot.
(b) edutainment programs to stimulate motivation to purchase the product and that introduce key messages on overcoming the barriers to the behavior and highlight the advantages of the product in a subtle, fun, and engaging way.

These two vehicles are discussed in a separate section below.

The key messages should reflect on positive aspects of the behavioral change, and the status aspirations of the customers, rather than focus on inducing fear of the hazards of

the current behavior.[11] With three official local languages besides English (Chewa, Shona, and Ndebele), slogan and bylines for the campaign will be need to be developed that conform to local semiotics. A communications expert will help to translate metaphors and turns of phrases for "lighting up lives," "wonder," "wisdom," and "enlightenment," in the formulation of slogans and tag lines for the campaign messages and branding that resonate with how better lighting is felt and experienced. This slogan should reinforce an internal feeling that the consumer has made a wise, inspirational, or heavenly choice. Since a very large majority of Malawians (80-85%) are Christian, the message could also resonate strongly with spiritual values and metaphors like "seeing or being guided by the (spiritual) light." Finally the messages should resonate as much as possible with the brand itself. There should be synergy with the specific lamp product names that seems to appeal to the target group and the general LFL campaign message.

In the final sub-stage, the campaign would adopt a participatory "advocacy" approach to ramping up sales, by actively involving the early adopters, reinforcing their decision, and rewarding them to spread the message. Printed flyers or posters for community spaces like churches or clinics could strongly feature pictures of satisfied (and more successful) early adopters actively using their solar lanterns. These would then serve as role models to inspire others to take action. Social marketing technology would also be employed in this phase. Another idea is to put in place a competition for older youth to reward and incentivize households for buying a solar lamp. For example, a prize can be offered for the best photo of an LFL product in use that is shared via SMS or Whatsapp. LFL could also sponsor an essay competition for teachers or youth on how LFL has transformed their academic performance or has promoted greater "harmony" on the home front.

In addition, this sub-stage will focus on after-sales contacts in order to foster subtle but highly effective word of mouth advocacy. Studies show that consumers are more likely to talk positively about a product if their decision has been positively reinforced and a relationship is built with the supplier or brand. Through SMS or vendor contact, a strong reinforcing message can be sent to the early adopters, perhaps suggesting ways to talk about the product with a peer over a well-lit dinner.

The fourth stage will be an *evaluation* of the campaign results. This stage is expected to last for about 2 months. Quantitative surveys will establish changes in lighting usage among households in the targeted communities, while similar data from control groups will show correlation with exposure to the campaign. The energy baselines would be revisited to quantify changes in patterns of households that: (a) use only traditional fuel

[11] Although literature in the health sector implies that fear-based appeals can be more effective in behavioral change campaigns, there is also evidence that the wrong message can backfire particularly if perceived self-efficacy or response efficacy is low. Given the likely level of general "disempowerment" among the targeted community, this tactic seems too risky as it could inspire active ignoring or reaction against the intended change. Therefore the negative or fear-based aspect of the campaign will be emphasized only in the very preliminary stages. See Kim Witte and Mike Allen, "A Meta-Analysis of Fear Appeals: Implications for Effective Public Health Campaigns," *Health Educ Behav* 2000; 27; 591.

wood (or candles); (b) use kerosene lamps; (c) use a combination of both wood fuels and kerosene lamps; (d) already use solar powered or rechargeable LED lamps.

Selected "control group" districts/villages will be selected for studying baseline and post-campaign survey work as a way to compare the relative effectiveness of the campaign on key performance indicators related to the LFL. Sales growth and trends will be a principal indicator of the evaluations. Surveys will help to establish sales growth rates, segmented by target sub-groups over time. This may require training and support to vendors and distributors on good sales record keeping and data quality control (this is not a communications expense per se but a general project monitoring cost).

In the final stage, the results of the evaluation will used to refine and tinker with the target groups, messages, and media being used in the campaign. Post campaign surveys and a couple additional focus groups will evaluate whether people remember the product being used in the various outreach and advertising mechanisms. They would also gauge product satisfaction and the willingness of early adopter to endorse or recommend the product to a friend. They will also find out how much prizes and competitions using social media motivate and engage early adopters in scale-up.

Campaign modifications are expected to be implemented in a further one-month period and with a stronger focus on "peer recommendations" and advocacy. Observation and community-based dialogic processes will greatly enhance an understanding of how to fine-tune the marketing strategy. New lessons could then be fully capitalized upon in a full roll-out. This will also include feedback loops on product design and innovation. Does the brand (name, color, shape, features) resonate with early adopters? Does the design fit actual user needs? Are LFL products perceived as being "cool" in addition to reliable? How can designs of new model be more user-experience driven?

III. BENEFITS AND INCONVENIENCES OF THE CHANGE

A. What benefits from the change need to be probed?

The benefits from changing lighting consumption behavior needs to be properly understood from the unique and subjective vantage point of the target group. Some of the expressed or perceived benefits could include:

- *Service Quality*. LED-based illumination dramatically increases the quality and quantity of lighting services, when compared to kerosene lamps. They are about four times more efficient than incandescent light bulbs and more resistant to wind. Other service quality

advantages include a better ability to direct light output to hard to reach places, as well as a greater durability compared to artisanal kerosene lamps.

- *Convenience and Ease-of-Use*. Some households may find the LFL lamps easier to use than their existing lighting systems, and more convenient in avoiding frequent trips to markets to purchase kerosene or candles. Indeed, an academic study of a pilot program in Malawi suggests that the distance households need to travel in order to purchase kerosene could be a more important factor in predicting predisposition to purchasing a solar LED lamp, compared to relative household expenditures on kerosene itself.[12]
- *Economic*. Despite having a high up-front cost, the ongoing long-run energy cost savings are significant, freeing up more disposable income over time. Previous studies have shown that rural household expenditures on kerosene are relatively stable, regardless of income bracket. Households that rely more heavily or exclusively on kerosene are likely to realize a faster payback by making the switch (estimated at 3-6 months), as compared to those households that rely more on candles or biomass fuels. The Chinansi Foundation estimates that Malawian families stand to save an average of 80% on their annual kerosene expenditures by switching to a solar lighting system.[13] The low DC voltage and wattage levels associated with LED-lamps also can be an appealing way to charge mobile phones at low cost in un-electrified areas.[14]
- *New Livelihoods.* The product could lead to more productivity or household income by creating new small businesses like mobile phone charging and by improving the illuminating quality over household tools (perhaps more relevant for men) and tasks normally performed by women such as sewing, handicraft production.
- *Health and safety*. Switching will reduce incidences of respiratory diseases, burns and fires. Kerosene lamps are often poorly made from scrap metal by semi-skilled artisans and can lead to burns and accidental fires if knocked over. For households with small infants and toddlers, this could be an important motivator for making the switch. Other health related benefits include less bothersome smoke as well as reduced incidence of indoor air related sickness.
- *Cultural*: A number of cultural practices (e.g., initiation ceremonies, cults, graveyards, and *dambwes* (camps for traditional dancers) require relative secrecy and hence thick forests. In some areas, solar lighting alternatives would contribute to keeping these forest resources in tact to conduct important cultural ceremonies.[15]

B. What disincentives or inconveniences from the change need to be probed? How can campaign messages counter these perceptions?

[12] Edwin Atkins et al, "Off-grid energy services for the poor: Introducing LED lighting in the Millennium Villages Project in Malawi," Energy Policy 38 (2010) 1087-1097.
[13] Chinansi Foundation Website. http://www.chinansifoundation.org/solar.php
[14] Edwin Atkins et al, 1087-1097.
[15] An elaboration of these rites is provided in Kambewa and Chiwaula (2010).

- *Battery replacement and performance*. A solar LED lantern battery needs about 2-3 hours of recharging time per use, and a complete replacement after every 1.5 years or so. It is important to understand which users may regard this as an inconvenience, and why. Some users have also reported that battery performance can be diminished in very hot climates.[16] Extended bad weather spells can also result in low lumen output.

  ↘ *Usage tips can be provided in written material format and disseminated with purchases. Stressing availability of after-sales service and support can help reduce anxiety over such issues. Instilling a culture of regular contact with clients can help counter perceptions of any inconvenience. Vendors need to be properly education on how to communicate in response to queries on inconveniences.*

- *Quality control and durability*. For a variety of reasons, including low existing market penetration and low standards enforced by the Malawian government, a prior lack of quality control may have created negative perceptions of product quality among target groups who have already been exposed to the technology. A Chinese manufactured product may be seen in a positive or a negative light by an impressionable customer.

↘ *The campaign should emphasize the LFL quality thresholds for technology standards and a minimum 1-year product warranty on purchases. After-sales service should be made easily available to customers and well communicated. This contact point provides an opportunity to give customers positive, reinforcing feedback on their behavioral change. This promotes consistent, sustainable behavioral change and can be helpful to ensure that customers talk about and promote the product to their friends. It may also encourage them to make additional future purchases for themselves.*

- *Battery disposal.* Uncontrolled disposal of batteries can lead to environmental damage.

↘ *Battery recycling programs could be set up in partnership with vendors, and batteries used typically do not contain Cadmium which is toxic*.

- *Jobs incubator – or killer*? Depending on the distribution model for solar lamps, a widespread market switch away from firewood and kerosene could be job-creating or job-killing. There is no local manufacturing or significant local assembly, unlike cook stoves. On the other hand, a fair number of new jobs could be created through creation of new micro-enterprises and franchisees. In contrast, the "firewood" industry in Malawi is well established, provides an estimated US$117.2 million toward GDP, and employs roughly 30,000 people either formally or informally.

↘ *Although these issues are unlikely to dis-incentivize the target customer*, *LFL can work to emphasize the participatory nature of its retailing campaign, empowering MFI staff and franchisees, which can contribute to local job growth. Potential jobs will be created in the*

[16] See for example, comments by public on News24 website on solar lamp sales in South Africa.

implementation phases, particularly for wholesalers and retailers who create downstream job opportunities for local community members. Plus LFL can focus on indirect enterprise development possibilities from households having more hours of light at their disposal.

IV. TARGET AUDIENCE & TARGETING MECHANISMS

A. Who are the hypothetical target audiences, and why?

In order for the campaign to be most effective, it should be highly segmented by target audience. A simple Venn-diagram model could be used to get a sense of the relative size and characteristics of target audience groups, and the degree to which they overlap. This could be a very useful exercise, particularly in conjunction with the synthesis of analysis from the informant interviews and baseline energy surveys.

A working hypothesis of an optimal target audience (early adopters) is characterized by:

☑ male head of household; employed full-time or seasonally
☑ household located in an un-electrified rural district
☑ household uses predominantly kerosene for lighting AND located 5km+ away from vending site for purchasing kerosene
☑ already owns a mobile phone (preferably basic smart phone)
☑ households contains at least one or more children (preferably older than 5)

Full-time employed artisans, shop owners, and seasonal agricultural workers are more likely to perceive the up-front costs to be least prohibitive and also better educated especially in math in order to get a handle on the implications of consumer finance offerings. Since Malawi is a relatively conservative society in sub-Saharan Africa, my assumption is that men are more likely than women to have more or full control over household finances, have a higher perceived self-efficacy to make large household purchases or to take on any credit, and also probably the party in the household who typically makes existing kerosene or candle purchases for lighting.[17]

In addition to segmenting the target audience by sex, the utility of further segmentation by households with children of school-attending age, versus single households or households which contain only babies, will be tested. In theory, households are likely to extract more prestige and value from better lighting, since their children could study longer. Larger households comprised of one or more parents and children currently attending school are also more likely to be predisposed to the change, as a means to promote greater family harmony and higher educational outcomes as an added

[17] On the other hand, since secondary source lighting may come from traditional wood fuels for cooking in some households, women may be the key decision-maker. Given that regular income is an important factor toward predisposal and suitability for the LFL product, however, it makes sense in the pilot phase to focus on male heads of households.

incentive to having more discretionary income over time. Anecdotal evidence from a program in Mafia Island, Tanzania, suggests that households with students perceive themselves to have larger relative benefits and also that a potentially effective, trustworthy messenger for the product could be a local school teacher.[18]

Other areas of potential target group segmentation include: education level, familiarity with or previous exposure to the product, as well as prior understanding of credit or having taken part in another offering from a microfinance organization. My assumption is that self-concept/perceived personal empowerment as well as prior exposure to a microfinance initiative or institution would be strong predisposition factors for LFL– and stronger than income level *per se*.

Finally, households which currently do not primarily use kerosene and rely instead mainly on low-cost or freely obtained dried grass or traditional wood fuels need to be segmented to see if the core messages resonate in the same way with them. Quite possibly, they will not. For example, a much stronger emphasis on the costs and hazards of current practices may have a stronger impact, or it may be unrealistic to persuade this target group to make an abrupt break with current practice and further efforts are necessary to connect with them in a "pre-contemplation" action phase.

B. How will the target audiences be reached? Where is product placement?

Since the technology is so "new", a core campaign tenet is that fully appreciating the product demands first-hand "experience" order to inspire change. Indeed, a "trial" period such as rental or a lease-to-buy business model could be highly useful as a way to sign-up new customers. However, focus groups from the early pilots in Malawi showed that rural clients consistently preferred outright ownership and that vendors were wary of the risk of products being damage under such structures. The experiential thrust does have strong implications however for product placement and media selection strategies. Because LFL targets customers in remote areas, more mainstream retail outlets such as electrical supply stores and mobile phone retailers are not very relevant to the product. The average target customer would not necessarily know that they wanted the product, never mind know where to buy it, even if they did realize that. The focus of placement is rather through MFI partners, village savings and loan organizations and their networks, and small entrepreneurs or franchisees. Secondly, in terms of media, traditional print advertisements in newspapers and periodicals, TV and radio spots, and articles paid for in mass media are likely to be far less effective in stimulating sales, when compared to product demonstrations and promotional events or non-traditional advertising channels. Average daily media consumption of TV and internet is likely to be low, and

[18] This begs the question whether school teachers themselves should be first targeted as early adopters so that they can be more effective advocates after seeing the direct benefits from themselves. Baseline assessment will determine to what degree there is overlap between school teachers and heads of households with steady income in the target regions.

even for avid radio listeners, radio advertisements are constrained in effectiveness since the product can neither be seen nor touched. Radio is better suited to sensitization.

During full-scale implementation of the campaign, at least six pilot "promotional events" will be executed whereby a pre-determined target audience of likely early adopters will be their simultaneously exposed to LFL product and encouraged to immediately buy one. Since cooking and eating dinner is one activity that people enjoy doing together at night, offering food and company during the demonstration could be an enticement. Obviously, customers need to be able to easily purchase lamps at the same time and place as applying for the consumer finance; these cannot be two separate steps or this will create barriers. Also since some target group members may feel uncomfortable around the idea of an installment loan, a fun atmosphere and positive group pressure can be used to overcome fear-provoking reservations of new behavior.

Another fairly obvious point is that it is important that the demonstrations and special events take place at dusk, so that the target groups can visibly and tangibly experience the better service quality of the solar LED lamps as compared to kerosene. Public spaces easily accessible to the target group would be best locations, which could include: town recreational rooms, schools, and churches could be explored as options. Night markets could also be explored, if available. Another distinct possibility could be for distributors and franchisees to undertake road shows that target heads of households working on sugar, tea and tobacco estates, as they would be a lower risk for consumer finance.[19] These road shows are also an opportunity to score "institutional" purchases for larger kits, as well as household sales.

The second main communications and marketing tool will be to developing a short theater piece with a local community theater group using an "edutainment" approach. The piece will illustrate the value of the product in a fun, exciting way and get more people talking about the product and their unique situation vis-à-vis the offering. The script should subtly hit on the clues to overcoming barriers that come out of the focus groups and pick up on the cultural preferences and semiotics of the branding. The piece can be performed during special promotional events and taken on road shows where specific segmented target groups are gathered by invitation. The sketch about solar lighting could also be used as a warm-up or intermission act for any regularly scheduled programs taking place in the targeted districts and villages.

Integrating LFL campaign messages into the script of a mainstream TV program in Malawi could be a second viable option to expose the product to a larger audience;

[19] First it must be verified if their housing is communal or if they receive a ration of kerosene or wood fuel from their employer as a "perk" and therefore have less incentive to purchase a solar lamp.

however, it could be relatively more difficult and expensive to pull off.[20] In addition heads of households may actually not watch much TV programming (to be verified in focus groups).

Observation points that need to be heeded in connection with pre-testing and roll-out of these two alternative channels to connect to the audience include:

- Are the gestures and language used in the sketches appropriate to the audience or in any way construed as insensitive?
- Does the audience seem to "get" the message? Do men and women respond differently to the message? If so, how?
- Did the sketch provoke curiosity, applause, or any immediate reaction or engagement?
- What, if anything, might be written into the script or used as a prop in order to make it funnier or more relevant to my life?

V. CAMPAIGN BUDGET & RESOURCES

A. How much will the campaign cost? Where will the resources come from?

The total estimated cost of the campaign is $ 100,000 roughly broken down as follows:

Qualitative Interviews & Energy Baseline: **$40,000**
Lit. survey/background research compilation + synthesis - 4 weeks @ $2000 per week = $8,000
Survey Enumerators – 4 @ 4 weeks @ $1000 per week = $16,000
Communications expert - 8 weeks @ $2000 per week = $16,000

Six Focus Groups (4 pre-campaign and 2 post-campaign): **$20,000**
Venue and food – 6 @ $1,500 unit cost = $9,000
Facilitator - 6 @ $1,500 unit cost = $9,000
Material/write-up = $1,000
Travel and per diem = $1,000

Edutainment Piece: **$7,500**
Scripting/Production = $3,000
Pre-testing = $1,000
Travel and roll-out to pilot areas = $3,500

Promotional Events: **$7,500**
Venue, catering, advertising – 6 @ $1,000 unit cost = $6,000

[20] Time and resources permitting, some inquiries can be made with mainstream TV shows to see if there is any interest in a free product placement or endorsement.

Local marketing assistance - $1,500

Flyers and Poster for Promotional Events: **$2,500**
Graphic Design = $1,000
Translation = $500
Printing = $1,000

Competition & Prizes for Social Marketing and Promotional Events = **$2,500**

Messaging Formulation, Segmentation, and Targeting: **$12,000**
Communications Consultant/Sr. Expert – 25 days @ $400/day = $10,000
Translation Services = 5 days @ $400/day = $2,000

Monitoring and Evaluation Support: **$8,000**
M&E Consultant– 20 days @ $400/day = $8,000

For a complex program of this nature, it is probably not that realistic that one single LFL partner entity can be in charge of the campaign. Instead of having a centralized budget for the campaign, each entity that is a stakeholder and beneficiary in the LFL will need to pledge resources against a work plan and final budget to be agreed upon by the full Communications and Outreach task team. These resource contributions could be in terms of funding for consultants, materials/placements, and travel, or in terms of in-kind staff resources and time for review and input toward outputs. Roughly one-half of the campaign costs are anticipated to be borne by the project financiers, with the rest coming from distributors and other partners. Supplemental grant funding (in addition to ACAD's contribution) will be sought from entities such as the UNEP/GEF supported en-lighten initiative. The Ministry of Energy of Malawi, the main agency responsible for energy policy development, may also be able to lend a hand in the assessment and evaluation phases of the campaign, as well as community-based NGOs listed in the beginning of this memorandum.

ANNEX I:

Technological Specifications for Solar Powered LED lighting systems	Room Lamp Kit	Desk Lamp Kit
Rated average life of the lamp (time at which the lamp's initial light output will decline by no more than 30%)	10,000 hours	10,000 hours
Lamp‟s battery charging circuit efficiency at time of purchase	≥ 50%	≥ 50%
Duration of warranty (years) (At a minimum, the warranty shall cover free replacement or repair of any failed lamps, batteries and where applicable solar panels)	1 year	1 year
Light output (lumens)	40 lumens	15 lumens but luminance of 25 lux over an area ≥0.1 m2 when suspended at distance of 0.75 meters or self-supported
Daily Burn Time (DBT) (hours)	3.5 hours	3.5 hours
Amount of time to fully charge the product	8 hours sunlight or 7 hours stable power charging	8 hours sunlight or 7 hours stable power charging
Lamp wattage (watts)	0.24W (4 LEDs per lamp: 3V x 0.02A = 0.06W x 4 LEDs)	.24W (4 LEDs per lamp: 3V x 0.02A = 0.06W x 4 LEDs)
Type of system charging the batteries	Solar PV 1.5 Wp solar panel x 1 / 2 Wp solar panel x 1	Solar PV 1 Wp solar panel
Type of batteries being charged by the renewable energy system	NiMH	NiMH
Rated Capacity of the batteries being charged (Ampere Hours)	1.5 Ampere Hours (Ah)	1.7 Ampere Hours (Ah)
Type of charge controller (e.g. active or passive)	Passive	Passive

ANNEX II: LIST OF SAMPLE QUESTIONS FOR ASSESSMENT PHASE INFORMANT INTERVIEWS

1. To what degree are rural Malawian households already exposed to solar LED lighting? How widely available are these products? Does it vary much by region?

2. What do people typically use lighting for?

3. Do people use multiple energy sources for lighting? What are the primary ones and what the secondary sources?

4. How do rural Malawian households understand or perceive the benefits of switching to solar lighting in relation to the costs?

5. Have any inconveniences or barriers to using or purchasing solar LED lamps been raised in your dealings with targeted households? If so, to what degree are these because of lack of full awareness or education of the product?

6. How is enhanced productivity or income understood in relation to the up-front or ongoing cost of the lamp purchase? Do women/men get it more easily? Are there split incentives present that need to be addressed?

7. How are lighting services prioritized? For example, for cooking, eating, preparing for bed, studying, or other artisanal work. What is the average length of time in total for using artificial light and for what purposes? Who decides on this prioritization?

8. Where do people typically spend their evenings? At home, markets, bars, churches, schools?

9. Have any teachers already promoted solar lanterns to older pupils? Would they be good messengers? How likely are heads of households likely to listen to older children on such decisions?

ANNEX III: LIST OF SAMPLE QUESTIONS FOR FOCUS GROUPS IN PLANNING AND CAMPAIGN PRE-TEST PHASE

Demographic information to be tallied beforehand (e.g., sex, age, number of people in household, household location and distance to vendor of kerosene, candles, a proxy indicator for relative income level and disposition to technology such as mobile phone ownership, employment status, etc.). Determination whether segmented groups can be combined.

- *Warm up questions.*

- *What activities do you currently use lighting for? Roughly for long for each activity? What is your first priority for lighting services? Second? Third?*

- *Do you wish you had more time for performing night-time activities where more/better light would be required or useful? For what specifically? Is there a specific activity that you dream of doing but currently do not because it would expensive to use lighting for?*

- *Are you aware of that using kerosene, candles, and wood fuels for lighting could be dangerous? Are you aware of, or have you heard about or witnessed any incidences of fires or burns from this practice in your community or nearby communities?*

- *Have you ever considered switching energy sources for lighting? (Test level of pre-consideration and whether this is higher or lower based on regional, household, income, or sex characteristics)*

- *Would you be the key decision-maker to purchase a major item for the entire household? To what degree are you influenced by other family members?*

- *How would more or better quality lighting affect your individual quality of life? What would the impact be on family life? For example, more face-to-face-time with your spouse/children, more time saved gathering wood or traveling to the store to buying kerosene or candles?*

- *Have you already heard about, or seen a solar lamp before? If so, where? Was it in a household or in a communal space use (gauge general familiarity with the product)? Have you ever heard about or seen an "LFL" specific product?*

- *To what degree is lighting perceived as basic functional need or as a luxury/indulgence? Do any special rituals come to mind as going together with using light a night? How could these be impacted or enhanced by improved quality, duration, or consistency of evening lighting?*

- *What would prevent you from buying a solar LED lamp today? What if you could buy one and pay the equivalent of the cost of X litres of kerosene over X months?*

- *Do you know that the battery in a solar LED lamp needs to be replaced? Do you know where to get one and how much this might cost? Could this be made more convenient?*

- *To whom is the LFL campaign message directed? Do you think it could it be you? Why or why not?*

- *How do you interpret the LFL campaign message? Does it get you to think differently or to take action?*